TECHNICAL NOTES

COFFEEVILLE PLANT MATERIALS CENTER

NO. 5 COFFEEVILLE, MISSISSIPPI 1987

ADVANCED EVALUATIONS OF GIANT REED: III. SURVIVAL AND SPREAD STUDY (1983-1986)

Abstract

Four accessions of giant reed were evaluated for survival and spread for a period of four years at the Coffeeville Plant Materials Center. PI-432432 was selected as the best on overall performance although PI-432430 was the more cold-tolerant and PI-432429 had a greater basal spread. Because accessions never tested at Coffeeville have performed better than PI-432432 at the Plant Materials Center at Brooksville, Florida, PI-432432 and five other accessions are undergoing further tests at both Plant Materials Centers.

Introduction

Fourteen accessions of giant reed (Arundo donax L.) were evaluated for streamchannel and shoreline erosion control at the Coffeeville Plant Materials Center (PMC) from 1976 through 1981, and four accessions were considered superior to the others because of better vigor and stem and rhizome production (Coffeeville PMC, 1982a). The four accessions of giant reed were:

PI-Number	Origin
432420	Collected in Yalobusha County, MS, by B. B. Billingsley, Jr.
432429	Obtained from the Knox City PMC.
432430	Obtained from the Knox City PMC.
432432	Collected in Cuthbert, GA, by James P. Bradley.

Plans for advanced evaluation of the four accessions were developed in 1982 (Coffeeville PMC, 1982b), and studies were initiated to determine how different planting conditions would affect their establishment from rhizomes so planting guides could be prepared and to gain additional information. The first of these studies was initiated in 1982 to determine the effect of planting depth. The studies showed that a good stand could be obtained under more adverse conditions than previously believed (Coffeeville PMC, 1982a.)

In 1982, another study was initiated to determine how establishment might be affected when the rhizomes were planted at different periods throughout the year. The test showed respectable survival for rhizomes planted in any month. June appeared to be the best month for planting but establishment was almost as rapid when planted from April to September. (Coffeeville PMC, 1987a).

In 1983, a study was made to determine how establishment might be affected when the rhizomes were planted in a somewhat haphazard position as might happen in actual situations. The study showed that an acceptable number of plants could be established from rhizomes in all positions. The normal growing position was best, but the advantage would probably not be worth the additional trouble of placing the rhizomes in the proper position (Coffeeville PMC, 1987b.)

Another study was initiated in 1983 to determine how well the four accessions would survive and spread over a longer period of time. This is a report for that study.

Materials and Methods

Twenty rhizome sections of normal planting condition were selected from each of the four accessions. Prior to planting, each section was weighed and the number of buds counted. The rhizomes were planted at a depth of five inches (12.5 cm.) on May 18, 1983, in the advanced evaluation area in Oaklimeter silt loam (0-2% slope) that had been plowed for weed control.

A randomized complete block design was used with four replications. Each plot consisted of a single row of five hills of one accession. Rhizomes were randomly selected and planted five feet apart within and between rows.

Evaluations consisted of recording the number of emerged stems for each hill at one, two, three, and six month intervals after planting. At the end of the growing season, the number of stems and average height and width of each hill was recorded.

At the end of each growing season, one hill from each plot was randomly selected for digging. Air dry weights of the underground (RHIZOME) and above ground (STEM) portions were recorded. Because several plots no longer had shoots for the fifth growing season all the remaining hill were dug at the end of the 1986 growing season and the study concluded.

Results and Discussion

Table I shows the number of buds per rhizome when planted and the number of stems counted on each evaluation date. Although some of the counts were made in the winter of the following year, they represent growth of the year indicated. Table II contains the average height and width of each hill at the end of the growing season, and the weights are shown in Table III.

Because of missing hills, the analysis of data consisted primarily of comparing averages. At planting, the rhizomes of PI-432432 were heavier and had more buds than the others, but because of the variance, the accessions were not significantly different. Neither was the number of buds closely correlated with rhizome weight or the number of stems produced later.

Therefore for shipping purposes, the accession with the lightest weight would be favored. If weights of the 20 rhizomes are representative, shipping weight per

1000 would be:

PI-Number	Kilograms	Pounds
432420	144.65	318
432429	133.75	294
432430	133.80	294
432432	168.05	370

After planting, however, the two accessions with the least weight appeared to be less promising. PI-432432 and PI-432420 showed the best establishment and stem productions although the differences were not significant at the end of the first season. The data agreed closely with that obtained in the depth and positions studies (Coffeeville PMC, 1987a; 1987b). Because the depth study was evaluated last in August, data for that month are used for the following comparison.

	% Establishment				Stem/Rhizome Ratio			
STUDY	432420	432429	432430	432432	432420	432429	432430	432432
Spread	100	95	90	100	8.0	7.6	7.4	9.2
Depth	68	79	74	80	4.4	3.5	3.4	3.8
Position	75	87	72	82	7.0	6.1	6.0	7.9
Average	81	87	79	87	6.5	5.7	5.6	7.0

The winter of 1983-1984 was unusually cold (Coffeeville PMC, 1983) and several hills perished. The accessions hit most severely were PI-432420 and PI-432429. The accession showing the least damage was PI-432430. A comparison of winter survival with data in the position study showed a reverse in the position of PI-432429 and PI-432430, however, the ranking remains the same after averaging. Percent that died in the winter was:

STUDY	432420	432429	432430	432432
Spread	45	42	5	25
Position	47	20	35	24
Average	46	31	20	25

Although planting conditions in some of the above studies represented drastic differences from the normal, the data for the three studies showed tendencies that were similar to this study. For the remainder of this spread study, comparative data were not available from other studies.

The data summarized below show increased growth over the evaluation period. A comparison, especially for PI-432420 and PI-432429, may be misleading because of missing hills. However, survival is a determinant in the selection of the best accession. The area covered was calculated using the width for each hill assuming the shape to be circular. The CORRECTED data was calculated to account for the hill that had died.

	UNCORRECTED				CORRECTED			
YEAR	432420	432429	432430	432432	432420	432429	432430	432432
				AREA (sq. meters)				
1983	0.168	0.129	0.120	0.157	0.084	0.071	0.102	0.110
1984	0.536	0.526	0.515	0.289	0.268	0.289	0.438	0.202
1985	1.003	0.851	0.375	0.898	0.502	0.468	0.319	0.629
1986	- -	2.400	1.186	1.451	- -	1.320	1.008	1.016
				STEM DENSITY (number/sq. meter)				
1983	130	170	207	190	65	94	176	133
1984	109	74	101	135	55	41	86	95
1985	79	69	138	77	40	38	117	54
1986	- -	61	63	57	- -	34	54	40
Ave.	106	94	127	115	53	52	108	80
				STEM MASS (Kgm/sq. meter)				
1983	6.61	9.38	8.83	9.43	3.30	5.16	7.51	6.60
1984	9.05	4.45	4.80	7.78	4.52	2.45	4.08	5.45
1985	11.00	16.56	16.40	8.11	5.50	9.11	13.94	5.68
1986	- -	10.49	7.05	10.71	- -	5.77	5.99	7.50
Ave.	8.89	10.22	9.27	9.01	4.44	5.62	7.88	6.31
				RHIZOME MASS (Kgm./sq. meter)				
1983	10.36	14.03	10.67	15.03	5.18	7.72	9.07	10.52
1984	39.94	26.25	19.15	46.61	19.97	14.44	16.28	32.62
1985	19.94	28.58	28.96	14.71	9.97	15.72	24.62	10.30
1986	- -	22.14	13.00	17.28	- -	12.18	11.05	12.10
Ave.	23.41	22.75	17.94	23.41	11.71	12.52	15.26	16.39

The preceding data showed that as the basal area of all accessions of giant reed was increasing, density of the stems was decreasing. For this reason, the mass per unit area was calculated and the result did not show any definite increase or decrease from year to year. The same situation existed underground. Without the correction for survival, the superiority of any accession would have been even less clear. However, the data did show that PI-432430 had more stems per unit area although data for height and biomass were not considerably different from those of the other accessions. Stems within any hill vary in height and diameter, but calculations showed that the stems of PI-432430 to be more slender altnough closer together. Although stem density could be important in breaking waves, it was considered to be less important with this species where the stouter stems would not be as prone to break from the force of the water. The relative thickness of the stems of the four accessions is shown as follows:

PI-Number	Average Stem Weight (Grams/Meter in Length)
432420	251
432429	337
432430	227
432432	287

Consideration should also be given to the underground portion of these plants for erosion control along lakes and streams. During the winter when much erosion occurs, the rhizomes are the parts that hold the soil. Since most of the mass of giant reed was underground, an average rhizome weight: stem weight ratio was calculated to determine the relative ability of each accession to assimilate underground mass. The results are as follows:

PI-Number	Rhizome Wt./Stem Wt. Ratio
432420	2.60
432429	2.81
432430	2.16
432432	2.75

In all of the preceding examples, the outstanding production for PI-432420 and PI-432429 may be because the weaker hills died in the winter of 1983-1984. This was taken into consideration in many instances in the CORRECTED data. How they would have performed if the unusually cold winter had not come at that time is not known. Sub-zero temperatures are common, however, north of Coffeeville so their useful range would be to the south. For colder climates PI-432430 may be best.

Conclusion

When all of the factors were taken into consideration, PI-432432 ranked near the top in all categories. To select the best, the accessions were ranked from the best to worst with the best being number 1. Then the scores were averaged as follows:

FACTOR	432420	432429	432430	432432
Shipping	3	1	2	4
Survival				
Establishment %	3	2	4	1
Stem/rhizome ratio	2	3	4	1
Cold Tolerance	4	3	1	2
Spread (Area-Corrected)	4	1	3	2
Stems				
Density (Corrected)	3	4	1	2
Size (Diameter)	3	1	4	2
Rhizomes				
Density (Corrected)	4	3	2	1
Wt. ratio	3	1	4	2
Average Rank	3.22	2.11	3.78	1.89

PI-432432 had the best scores of the four candidates at Coffeeville. However, five other accessions, some never tried at Coffeeville, scored higher at the Plant Materials Center at Brooksville, Florida where an assembly of giant reed was also being considered for erosion control (Brooksville PMC, 1986.) Since the demand for giant reed will probably not justify two releases, both the Coffeeville and Brooksville PMC are continuing advanced evaluations of the top

six which are:

Accession	Origin
432425	Start County, Texas
432427	Sumter County, Georgia
432432	Randolph County, Georgia
9035155	Ware County, Georgia
9035156	Walton County, Florida
9035262	Leon County, Florida

References

Brooksville PMC 1986. Annual Technical Report, pp. 12-27.
Coffeeville PMC 1982a. Annual Technical Report 1981-1982, pp. 155-156, 169-171, 173.
Coffeeville PMC 1982b. Project 28A282E: Plan for Selection and Release of a Superior Variety of Giant Reedgrass, Arundo donax.
Coffeeville PMC 1983. Report of Activities.
Coffeeville PMC 1987a. Technical Notes No. 3. Advanced Evaluation of Giant Reed: I. Results of the Monthly Planting Study
Coffeeville PMC 1987b. Technical Notes No. 4. Advanced Evaluation of Giant Reed: II. Planting Position Study.

TABLE I. STEM PRODUCTION FOR FOUR SELECTED ACCESSIONS OF GIANT REED AT THE COFFEEVILLE PMC (1983 - 1986)

Hill No.	Buds at Planting 5/18/83	Number of Stems on Evaluation Date: 1983 Growth 6/13	7/15	8/15	11/17	1984 Growth 3/8/85	1985 Growth 1/13/86	1986 Growth 1/28/87
PI-432420								
BLOCK A								
1	3	1	3	8	19	***	***	***
2	3	1	3	12	37	**	**	**
3	3	1	1	14	13	85	***	***
4	1	2	4	8	23	**	**	**
5	7	1	3	8	29	63	77	***
Ave.	3.4	1.2	2.8	10.0	24.2	74.0	77.0	
BLOCK B								
1	1	1	3	7	33	**	**	**
2	3	1	5	5	23	**	**	**
3	4	1	2	5	18	***	***	***
4	4	1	1	11	11	**	**	**
5	1	1	3	7	35	**	**	**
Ave.	2.6	1.0	2.8	7.0	24.0			
BLOCK C								
1	2	2	4	6	24	***	***	***
2	3	1	3	8	21	55	52	***
3	1	2	8	3	36	29	***	***
4	1	4	6	8	25	11	10	****
5	2	1	3	5	22	**	**	**
Ave.	1.8	2.0	4.8	6.0	25.6	31.7	31.0	
BLOCK D								
1	3	3	5	10	25	79	***	***
2	1	2	4	8	26	***	***	***
3	3	1	3	8	34	34	109	***
4	2	1	2	8	26	**	**	**
5	4	2	4	11	25	25	**	**
Ave.	2.6	1.8	3.6	9.0	27.2	38.0	109.0	
PI Ave.	2.6	1.5	3.5	8.0	25.2	43.3	62.0	

* Rhizome never sprouted.
** Died in winter of 1983-84.
*** Dug to obtain weights.

Table I continued.

Hill No.	Buds at Planting 5/18/83	Number of Stems on Evaluation Date: 1983 Growth 6/13	7/15	8/15	11/17	1984 Growth 3/8/85	1985 Growth 1/13/86	1986 Growth 1/28/87
				PI-432429				
				BLOCK A				
1	2	1	3	8	34	20	***	***
2	3	1	2	8	22	**	**	**
3	1	5	5	10	17	**	**	**
4	1	0	3	7	14	***	***	***
5	2	1	6	9	19	**	**	**
Ave.	1.8	1.6	3.8	8.4	21.2	20.0		
				BLOCK B				
1	3	2	5	8	28	***	***	***
2	3	2	3	12	24	**	**	**
3	1	0	0	0	0	*	*	*
4	3	2	5	7	20	53	***	***
5	4	1	3	9	19	**	**	**
Ave.	2.8	1.4	3.2	7.2	18.2	53.0		
				BLOCK C				
1	3	1	3	10	31	75	92	137
2	4	1	3	8	28	***	***	***
3	7	2	6	8	36	81	136	154
4	4	1	3	6	23	39	***	***
5	1	1	3	5	20	31	59	***
Ave.	3.8	1.2	3.6	7.4	27.6	56.5	95.7	145.5
				BLOCK D				
1	2	1	3	6	22	**	**	**
2	2	3	5	8	22	**	**	**
3	2	1	2	7	18	***	***	***
4	2	1	4	7	22	44	***	***
5	4	3	6	8	29	**	**	**
Ave.	2.4	1.8	4.0	7.2	22.6	44.0		
PI Ave.	2.7	1.5	3.6	7.6	22.4	49.0	95.7	145.5

* Rhizome never sprouted.
** Died in winter of 1983-84.
*** Dug to obtain weights.

Table I continued.

Hill No.	Buds at Planting 5/18/83	Number of Stems on Evaluation Date: 1983 Growth 6/13	7/15	8/15	11/17	1984 Growth 3/8/85	1985 Growth 1/13/86	1986 Growth 1/28/87
PI-432430								
BLOCK A								
1	1	1	3	4	27	59	71	71
2	1	2	5	6	29	***	***	***
3	3	1	4	5	34	70	78	89
4	2	2	5	11	28	43	***	***
5	3	2	7	7	31	64	54	***
Ave.	2.0	1.6	4.8	6.6	29.8	59.0	67.7	80.0
BLOCK B								
1	2	1	5	8	23	106	***	***
2	4	4	6	14	44	40	64	***
3	1	0	0	0	0	*	*	*
4	2	1	3	5	21	***	***	***
5	2	2	5	9	24	**	**	**
Ave.	2.2	1.6	3.8	7.2	22.4	73.0	64.0	
BLOCK C								
1	2	1	9	13	18	10	18	23
2	1	1	2	10	26	31	29	***
3	2	1	3	6	27	27	***	***
4	4	4	7	11	26	45	65	95
5	1	1	3	8	26	***	***	***
Ave.	2.0	1.6	4.8	9.6	24.6	28.2	37.3	59.0
BLOCK D								
1	1	1	4	7	23	***	***	***
2	3	1	4	9	29	57	59	94
3	4	0	5	8	35	49	60	***
4	2	1	5	6	31	31	***	***
5	1	0	0	0	0	*	*	*
Ave.	2.2	0.6	3.6	6.0	23.6	45.7	59.5	94.0
PI Ave.	2.1	1.4	4.2	7.4	25.1	48.6	55.3	74.4

* Rhizome never sprouted.
** Died in winter of 1983-84.
*** Dug to obtain weights.

Table I continued.

Hill No.	Buds at Planting 5/18/83	Number of Stems on Evaluation Date: 1983 Growth 6/13	7/15	8/15	11/17	1984 Growth 3/8/85	1985 Growth 1/13/86	1986 Growth 1/28/87
				PI-432432				
				BLOCK A				
1	2	4	11	11	33	18	30	***
2	2	4	4	15	16	13	***	***
3	5	1	2	8	14	15	21	****
4	3	1	6	9	30	**	**	**
5	7	2	4	7	30	***	***	***
Ave.	3.8	2.4	5.4	10.0	24.6	15.3	25.5	
				BLOCK B				
1	3	1	3	6	13	49	83	132
2	3	3	4	13	33	53	***	***
3	2	1	4	6	20	44	98	***
4	2	3	8	8	31	***	***	***
5	2	1	1	5	12	**	**	**
Ave.	2.4	1.8	4.4	7.6	21.8	48.7	90.5	132.0
				BLOCK C				
1	3	2	6	7	33	10	21	34
2	3	3	7	9	49	55	***	***
3	3	1	3	5	28	61	58	***
4	1	2	5	9	25	***	***	***
5	3	2	6	11	18	**	**	**
Ave.	2.6	2.0	5.4	8.2	30.6	42.0	39.5	34.0
				BLOCK D				
1	7	3	3	5	33	***	***	***
2	2	2	3	7	33	90	89	***
3	3	6	7	10	34	35	***	***
4	3	1	7	12	27	**	**	**
5	3	1	11	14	20	**	**	**
Ave.	3.6	2.6	6.2	11.2	29.4	62.5	89.0	
PI Ave.	3.1	2.2	5.4	9.2	26.6	40.3	57.1	83.0

* Rhizome never sprouted.
** Died in winter of 1983-84.
*** Dug to obtain weights.
**** Died from unknown cause.

TABLE II. HEIGHT AND WIDTH OF HILLS OF GIANT REED FROM SINGLE RHIZOMES PLANTED 5/18/83 AT THE COFFEEVILLE PMC

Hill No.	Height (in.) 8/83	11/83	1984	1985	1986	Width (in.) 8/83	11/83	1984	1985	1986
				PI-432420						
				BLOCK A						
1	40	103	***	***	***	7.5	19.5	***	***	***
2	48	97	**	**	**	6.0	17.0	**	**	**
3	32	77	171	***	***	5.0	15.0	41.0	***	***
4	36	92	**	**	**	7.0	15.0	**	**	**
5	38	91	166	168	***	8.0	14.5	34.0	48.0	***
Ave.	38.8	92.0	168.5	168.0		6.7	16.2	37.5	48.0	
				BLOCK B						
1	42	123	**	**	**	4.0	17.5	**	**	**
2	24	108	**	**	**	3.5	20.5	**	**	**
3	35	92	***	***	***	3.0	14.0	***	***	***
4	42	76	**	**	**	6.0	9.0	**	**	**
5	60	95	**	**	**	6.5	15.5	**	**	**
Ave.	40.6	98.8				4.6	15.3			
				BLOCK C						
1	32	107	***	***	***	6.0	15.5	***	***	***
2	49	97	170	177	***	7.5	14.0	30.0	38.5	***
3	21	100	112	***	***	3.5	20.0	17.5	***	***
4	27	128	46	68	****	6.5	16.0	9.0	7.0	****
5	37	102	**	**	**	8.0	20.0	**	**	**
Ave.	33.2	106.8	109.3	122.5		6.3	17.1	18.8	22.8	
				BLOCK D						
1	33	99	180	***	***	6.0	18.0	47.5	***	***
2	42	113	***	***	***	7.0	24.0	***	***	***
3	59	117	145	181	***	6.0	20.0	38.0	47.0	***
4	52	124	**	**	**	6.5	17.0	**	**	**
5	34	96	**	**	**	7.0	18.5	**	**	**
Ave.	44.0	109.8	162.5	181.0		6.5	19.5	42.8	47.0	
PI Ave.	39.2	101.8	141.4	148.5		6.0	17.0	31.0	35.2	

** Died in winter of 1983-84.
*** Dug to obtain weights.
**** Died from unknown cause.

Table II. continued.

Hill No.	Height (in.) 8/83	11/83	1984	1985	1986	Width (in.) 8/83	11/83	1984	1985	1986
				PI-432429						
				BLOCK A						
1	30	111	138	***	***	8.0	21.0	21.5	***	***
2	38	93	**	**	**	6.5	15.0	**	**	**
3	44	98	**	**	**	5.5	10.0	**	**	**
4	50	74	***	***	***	5.0	13.0	***	***	***
5	45	93	**	**	**	7.0	15.5	**	**	**
Ave.	41.4	93.8	138.0			6.4	14.9	21.5		
				BLOCK B						
1	35	118	***	***	***	7.0	21.0	***	***	***
2	27	100	**	**	**	5.0	18.0	**	**	**
3	*	*	*	*	*	*	*	*	*	*
4	42	86	160	***	***	6.5	15.0	37.5	***	***
5	56	106	**	**	**	7.5	15.0	**	**	**
Ave.	40.0	102.5	160.0			6.5	17.2	37.5		
				BLOCK C						
1	52	109	180	180	165	6.0	24.5	40.0	50.0	72.0
2	42	112	***	***	***	5.5	19.0	***	***	***
3	36	98	172	216	132	6.0	19.0	47.0	56.5	67.5
4	17	87	167	***	***	3.0	16.5	37.5	***	***
5	38	72	153	180	***	3.5	14.0	31.0	41.0	***
Ave.	37.0	95.6	168.0	192.0	148.5	4.8	18.6	38.9	49.2	69.8
				BLOCK D						
1	48	102	**	**	**	6.5	16.0	**	**	**
2	50	125	**	**	**	6.5	18.5	**	**	**
3	34	89	***	***	***	5.5	14.0	***	***	***
4	40	104	150	***	***	4.5	17.0	32.5	***	***
5	51	100	**	**	**	5.5	18.5	**	**	**
Ave.	44.6	104.0	150.0			5.7	16.8	32.5		
PI Ave.	40.8	98.8	160.0	192.0	148.5	5.8	16.9	35.3	49.2	69.8

* Rhizome never sprouted.
** Died in winter of 1983 84.
*** Dug to obtain weights.

Table II. continued.

Hill No.	Height (in.) 8/83	11/83	1984	1985	1986	Width (in.) 8/83	11/83	1984	1985	1986
				PI-432430						
				BLOCK A						
1	40	111	164	131	162	3.0	18.5	33.0	42.0	55.0
2	49	107	***	***	***	4.0	16.5	***	***	***
3	51	103	182	154	150	2.5	19.0	41.0	48.5	64.0
4	40	109	160	***	***	5.5	20.5	32.5	***	***
5	40	121	160	191	***	4.0	20.0	30.0	38.5	***
Ave.	44.0	110.2	166.5	158.7	156.0	3.8	18.9	34.1	43.0	59.5
				BLOCK B						
1	54	123	204	***	***	8.0	19.5	42.0	***	***
2	70	147	188	166	***	10.5	21.5	29.0	39.0	***
3	*	*	*	*	*	*	*	*	*	*
4	42	111	***	***	***	3.0	16.0	***	***	***
5	46	102	**	**	**	5.0	17.0	**	**	**
Ave.	53.0	120.8	196.0	166.0		6.6	18.5	35.5	39.0	
				BLOCK C						
1	57	116	106	92	120	6.0	14.0	8.0	19.0	23.5
2	42	146	141	110	***	8.0	15.5	27.0	27.5	***
3	39	132	153	***	***	5.5	15.5	22.0	***	***
4	46	119	161	144	150	6.0	20.0	35.0	45.5	55.5
5	60	107	***	***	***	9.0	13.5	***	***	***
Ave.	48.8	124.0	140.2	115.3	135.0	6.9	15.7	23.0	30.7	39.5
				BLOCK D						
1	52	102	***	***	***	4.5	16.0	***	***	***
2	49	113	177	143	120	4.5	16.0	30.0	31.0	44.0
3	50	95	182	185	***	5.0	16.0	16.5	42.5	***
4	42	126	142	***	***	4.5	17.5	26.0	***	***
5	*	*	*	*	*	*	*	*	*	*
Ave.	48.2	190.0	167.0	164.0	120.0	4.6	16.4	24.2	36.8	44.0
PI Ave.	48.3	116.1	163.1	164.5	140.4	5.5	17.4	28.6	37.1	48.4

* Rhizome never sprouted.
** Died in winter of 1983-84.
*** Dug to obtain weights.

Table II. continued.

Hill No.	Height (in.) 8/83	11/83	1984	1985	1986	Width (in.) 8/83	11/83	1984	1985	1986
				PI-432432						
				BLOCK A						
1	46	103	98	88	***	7.5	22.0	9.0	29.0	***
2	33	85	68	***	***	5.5	14.5	7.0	***	***
3	47	103	82	80	****	6.5	15.5	13.5	21.0	****
4	32	85	**	**	**	5.0	17.5	**	**	**
5	45	103	***	***	***	7.5	18.0	***	***	***
Ave.	40.6	95.8	82.7	84.0		6.4	17.5	9.8	25.0	
				BLOCK B						
1	38	91	158	190	168	2.5	15.0	35.0	47.0	71.0
2	51	114	170	***	***	7.5	22.5	31.0	***	***
3	39	109	162	188	***	3.5	16.0	23.0	45.0	***
4	40	85	***	***	***	3.5	18.0	***	***	***
5	43	92	**	**	**	5.0	14.0	**	**	**
Ave.	42.2	98.2	163.3	189.0	168.0	4.4	17.1	29.7	46.0	71.0
				BLOCK C						
1	54	111	117	136	126	5.5	19.5	11.5	23.5	36.0
2	38	92	141	***	***	6.5	16.5	32.0	***	***
3	46	99	159	174	***	5.0	16.0	32.5	46.0	***
4	37	98	***	***	***	5.0	19.0	***	***	***
5	41	95	**	**	**	6.0	22.0	**	**	**
Ave.	43.2	99.0	139.0	155.0	126.0	5.6	18.6	25.3	34.8	36.0
				BLOCK D						
1	22	108	***	***	***	7.0	15.5	***	***	***
2	48	107	160	157	***	6.5	17.0	37.0	48.5	***
3	42	117	152	***	***	7.0	22.0	25.5	***	***
4	34	110	**	**	**	6.5	17.5	**	**	**
5	51	98	**	**	**	7.5	15.0	**	**	**
Ave.	39.4	108.0	156.0	157.0		6.9	17.4	31.2	48.5	
PI Ave.	41.4	100.2	133.4	144.7	147.0	5.8	17.6	23.4	37.1	53.5

** Died in winter of 1983-84.
*** Dug to obtain weights.
**** Died from unknown cause.

TABLE III. WEIGHT (kg.) FOR UNDERGROUND (RHIZOME) AND AERIAL PORTIONS (STEM) OF GIANT REEDS AT THE END OF GROWING SEASON (1983-1986)

Hill No.	Planted(gm.)	RHIZOME 1983	RHIZOME 1984	RHIZOME 1985	RHIZOME 1986	STEM 1983	STEM 1984	STEM 1985	STEM 1986
				PI-432420					
				BLOCK A					
1	160	1.81	***	***	***	1.00	***	***	***
2	184		**	**	**		**	**	**
3	108		23.52	***	***		5.34	***	***
4	184		**	**	**		**	**	**
5	90			26.82	***			13.64	***
Ave.	145.2	1.81	23.52	26.82		1.00	5.34	13.64	
				BLOCK B					
1	57		**	**	**		**	**	**
2	155		**	**	**		**	**	**
3	100	0.87	***	***	***	0.68	***	***	***
4	118		**	**	**		**	**	**
5	65		**	**	**		**	**	**
Ave.	99.0	0.87				0.68			
				BLOCK C					
1	48	2.02	***	***	***	1.35	***	***	***
2	115			10.46	***			6.71	***
3	95		7.50	***	***		0.70	***	***
4	234				****				****
5	104		**	**	**		**	**	**
Ave.	119.2	2.02	7.50	10.46		1.35	0.70	6.71	
				BLOCK D					
1	249		33.18	***	***		8.50	***	***
2	245	2.25	***	***	***	1.40	***	***	***
3	277			22.73	***			12.73	***
4	167		**	**	**		**	**	**
5	138		**	**	**		**	**	**
Ave.	215.2	2.25	33.18	22.73		1.40	8.50	12.73	
PI Ave.	144.6	1.74	21.40	20.00		1.11	4.85	11.03	

** Died in winter of 1983-84.
*** Dug to obtain weights.
**** Died from unknown cause.

Table III. continued.

Hill No.	Planted(gm.)	RHIZOME 1983	RHIZOME 1984	RHIZOME 1985	RHIZOME 1986	STEM 1983	STEM 1984	STEM 1985	STEM 1986
				PI-432429					
				BLOCK A					
1	226		8.41	***	***		1.41	***	***
2	94		**	**	**		**	**	**
3	270		**	**	**		**	**	**
4	90	0.51	***	***	***	0.34	***	***	***
5	165		**	**	**		**	**	**
Ave.	169.0	0.51	8.41			0.34	1.41		
				BLOCK B					
1	232	3.34	***	***	***	2.13	***	***	***
2	202		**	**	**		**	**	**
3	105	*	*	*	*	*	*	*	*
4	114		19.32	***	***		3.07	***	***
5	93		**	**	**		**	**	**
Ave.	149.2	3.34	19.32			2.13	3.07		
				BLOCK C					
1	65				49.44				25.40
2	145	2.19	***	***	***	1.50	***	***	***
3	75				56.70				24.95
4	125		15.91	***	***		3.07	***	***
5	54			24.32	***			14.09	***
Ave.	92.8	2.19	15.91	24.32	53.07	1.50	3.07	14.09	25.18
				BLOCK D					
1	136		**	**	**		**	**	**
2	139		**	**	**		**	**	**
3	60	1.19	***	***	***	0.86	***	***	***
4	90		11.59	***	***		1.82	***	***
5	195		**	**	**		**	**	**
Ave.	124.0	1.19	11.59			0.86	1.82		
PI Ave.	133.8	1.81	13.81	24.32	53.07	1.21	2.34	14.09	25.18

* Rhizome never sprouted.
** Died in winter of 1983-84.
*** Dug to obtain weights.

Table III. continued.

Hill No.	Planted(gm.)	RHIZOME 1983	RHIZOME 1984	RHIZOME 1985	RHIZOME 1986	STEM 1983	STEM 1984	STEM 1985	STEM 1986
				PI-432430					
				BLOCK A					
1	149				18.14				11.34
2	170	1.83	***	***	***	1.24	***	***	***
3	105				24.04				12.81
4	123		6.70	***	***		1.25	***	***
5	118			9.55	***			8.41	***
Ave.	133.0	1.83	6.70	9.55	21.09	1.24	1.25	8.41	12.08
				BLOCK B					
1	135		19.32	***	***		3.07	***	***
2	270			8.41	***			5.46	***
3	68	*	*	*	*	*	*	*	*
4	61	1.02	***	***	***	0.81	***	***	***
5	145		**	**	**		**	**	**
Ave.	135.8	1.02	19.32	8.41		0.81	3.07	5.46	
				BLOCK C					
1	40				3.18				2.27
2	190			3.41	***			1.82	***
3	82		8.64	***	***		0.57	***	***
4	298				19.97				13.72
5	54	1.00	***	***	***	0.99	***	***	***
Ave.	134.8	1.00	8.64	3.41	11.58	0.99	0.57	1.82	8.00
				BLOCK D					
1	65	1.28	***	***	***	1.21	***	***	***
2	188				11.79				6.58
3	165			22.05	***			8.91	***
4	166		4.77	***	***		5.00	***	***
5	64	*	*	*	*	*	*	*	*
Ave.	131.6	1.28	4.77	22.05	11.79	1.21	5.00	8.91	6.58
PI Ave.	133.8	1.28	9.85	10.86	15.42	1.06	2.47	6.17	9.34

* Rhizome never sprouted.
** Died in winter of 1983-84.
*** Dug to obtain weights.

Table III. continued.

Hill No.	Planted(gm.)	RHIZOME 1983	RHIZOME 1984	RHIZOME 1985	RHIZOME 1986	STEM 1983	STEM 1984	STEM 1985	STEM 1986
				PI-432432					
				BLOCK A					
1	326			3.64	***			2.39	***
2	213		2.27	***	***		0.14	***	***
3	92				****				****
4	273		**	**	**		**	**	**
5	211	2.97	***	***	***	1.66	***	***	***
Ave.	223.0	2.97	2.27	3.64		1.66	0.14	2.39	
				BLOCK B					
1	136				42.64				26.76
2	285		18.30	***	***		3.00	***	***
3	60			14.09	***			10.46	***
4	58	1.69	***	***	***	1.02	***	***	***
5	108		**	**	**		**	**	**
Ave.	129.4	1.69	18.30	14.09	42.64	1.02	3.00	10.46	26.76
				BLOCK C					
1	203				7.71				4.31
2	122		16.14	***	***		3.23	***	***
3	85			13.07	***			7.27	***
4	118	2.16	***	***	***	1.44	***	***	***
5	158		**	**	**		**	**	**
Ave.	137.2	2.16	16.14	13.07	7.71	1.44	3.23	7.27	4.31
				BLOCK D					
1	399	2.62	***	***	***	1.79	***	***	***
2	144			22.05	***			8.98	***
3	250		17.16	***	***		2.64	***	***
4	72		**	**	**		**	**	**
5	48		**	**	**		**	**	**
Ave.	182.6	2.62	17.16	22.05		1.79	2.64	8.98	
PI Ave.	166.0	2.36	13.47	13.21	25.18	1.48	2.25	7.28	15.54

** Died in winter of 1983-84.
*** Dug to obtain weights.
**** Died from unknown cause.